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technical report

Estimating the Need for Family Planning/ Reproductive Health Service Providers in Malawi

JHP-23

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- The Nurses and Midwives Council of Malawi
- Christian Health Association of Malawi (CHAM) Training Institutions
- Kamuzu College of Nursing (KCON)
- Malawi College of Health Sciences (MCHS)

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired immunodeficiency syndrome
BLM	Banja La Mtsogolo
CBDA	Community-based distribution agent
CHAM	Christian Health Association of Malawi
CO	Clinical officer
DHS	Demographic and Health Surveys
FP	Family planning
FP/RH	Family planning/Reproductive health
FPAK	Family Planning Association of Kenya
HR	Human resources
HRMD	Human Resources Management and Development
IUD	Intrauterine Device
KCON	Kamuzu College of Nursing
MA	Medical assistant
MCHS	Malawi College of Health Sciences
MOHP	Ministry of Health and Population
NMT	Nurse-midwife technician
NT	Nurse technician
RHU	Reproductive Health Unit
RN	Registered Nurse
RNM	Registered Nurse Midwife
RTI	Research Triangle Institute
SDP	Service delivery point
TFGI	The Futures Group International
TFR	Total fertility rate

EXECUTIVE SUMMARY

Using the training needs projection methods in the Spectrum Policy Modeling System software module ProTrain™, JHPIEGO collaborated with the Malawi Ministry of Health and Population (MOHP) Reproductive Health Unit (RHU) to estimate numbers of Family Planning/Reproductive Health (FP/RH) service providers who are needed to reach total fertility rate (TFR) and contraceptive prevalence goals for Malawi from 2001–2007.

ProTrain™ allows the user to project the available versus required number of trained and competent family planning (FP) service providers of several FP methods, in various sectors of a national health system, given expected client demand and expected training outputs.

In creating these FP human resource projections, JHPIEGO was building upon work done at the FP/RH Projections Update Workshop in Malawi in March 2003 by the Malawi MOHP Reproductive Health Unit. Those demographic and FP projections form the foundation for the current human resources (HR) study. A conservative demography/family planning model was used, which assumed that the decline in TFR between 2001 and 2015 would be at the same rate as the decline measured between the two Malawi Demographic and Health Surveys (DHSs) in 1992 and 2000. This is a slower rate of decline, reaching 5.64 by the year 2015 instead of the population policy goal of 4.5 by 2015. The demography/family planning model was based on constrained rather than adequate resources to meet the TFR goal. The FP projection contains estimates of current and anticipated future percentages of eligible women receiving their contraceptive services from different sources within Malawi: public and private sector, Christian Health Association of Malawi (CHAM), Banja La Mtsogolo (a local nongovernmental organization), and community-based distribution agents (CBDAs).

In order to construct the training projection model, JHPIEGO gathered data on several aspects of the preservice and inservice training that produces FP providers, and on FP service delivery in Malawi, from various data sources. The data sources included national human resource and training plans, and interviews with personnel at the Malawi MOHP Human Resources Management and Development (HRMD) and Planning Unit offices, the MOHP Reproductive Health Unit, the Nurses and Midwives Council of Malawi, and at several of the preservice institutions.

Results showed that current FP/RH training outputs would result in adequate to surplus numbers of injectables providers. However, there would not be sufficient providers of Norplant® implants and female sterilization in Malawi over the period 2001–2007. Introducing additional preservice training alone would bring the numbers of female sterilization providers up to meet the projected needs, but additional preservice education and inservice training would be needed to produce sufficient Norplant providers. The demand for condoms and pills will also surpass the number of providers of these methods in the projection period from 2001 to 2007, although introducing more training was not modeled in the current set of projections.

Important to note in any projection model is that changes to the inputs will mean changes in projection outputs. Making changes in the human resource aspects of the ProTrain™ model could include training more FP providers in inservice or preservice, improving training to increase competency rates, and changing the conditions of service to increase retention rates. These are qualitative issues in human resources for health that are important for every capacity building program in the health sector.

ESTIMATING THE NEED FOR FAMILY PLANNING/ REPRODUCTIVE HEALTH SERVICE PROVIDERS IN MALAWI

BACKGROUND

JHPIEGO has collaborated with the Malawi Ministry of Health and Population (MOHP) Reproductive Health Unit (RHU) to estimate the numbers of family planning/reproductive health (FP/RH) service providers who are needed to reach total fertility rate (TFR) and contraceptive prevalence goals for Malawi from 2001–2007. We are using the training needs projection methods (ProTrain v. 1.65) jointly developed by The Futures Group International and JHPIEGO in the mid-1990s. This software allows the user to project the available versus the required number of trained and competent FP service providers of various FP methods, in various sectors of a national health system, given expected client demand and expected training outputs. All of this modeling is accomplished in the Spectrum Policy Modeling System family of modeling tools developed by The Futures Group. Spectrum includes modeling tools for demographic projections (DemProj module) that include the impact of AIDS (AIM module), as well as family planning usage projections (FamPlan module).

In order to construct the training projection model, JHPIEGO gathered data on several aspects of preservice and inservice training in Malawi, which produces FP providers. Below we have documented the assumptions and data sources.

METHODS

Demography (DemProj) and Family Planning (FamPlan) Models

This exercise used the demographic and FP projections developed by the RHU and other key stakeholders in the FP/RH Projections Update Workshop (March 11–12 2003), with the assistance of Shawn Aldridge of Research Triangle Institute (RTI) in North Carolina. Several models had been developed at the workshop to estimate changes in the population of Malawi for the years 1982–2015 given a variety of factors including the impact of the AIDS epidemic and different expectations regarding change in the TFR. For the present training needs projections, a conservative demography/family planning model was used, which assumed that the decline in TFR between 2001 and 2015 would be at the same rate as the decline measured between the two DHSs (1992 and 2000). This is a slower rate of decline, reaching 5.64 by the year 2015 instead of the population policy goal of 4.5 by 2015. Another conservative element of the demography/family planning model is that it was based on constrained rather than adequate resources to meet the TFR goal. In order to cover a more manageable period for training projections, the demography/family planning model was truncated to the years 2001–2007, with TFR goals as shown in **Table 1**.

Table 1. Projected Changes in Total Fertility Rate, Malawi

YEAR	TFR
2001	6.30
2002	6.26
2003	6.21
2004	6.16
2005	6.11
2006	6.07
2007	6.02

Source: DemProj estimates, RTI.

General changes in population from 2001–2007 are incorporated into the model (**Table 2**).

Table 2. Projected Changes in Malawi Population: 2001–2007

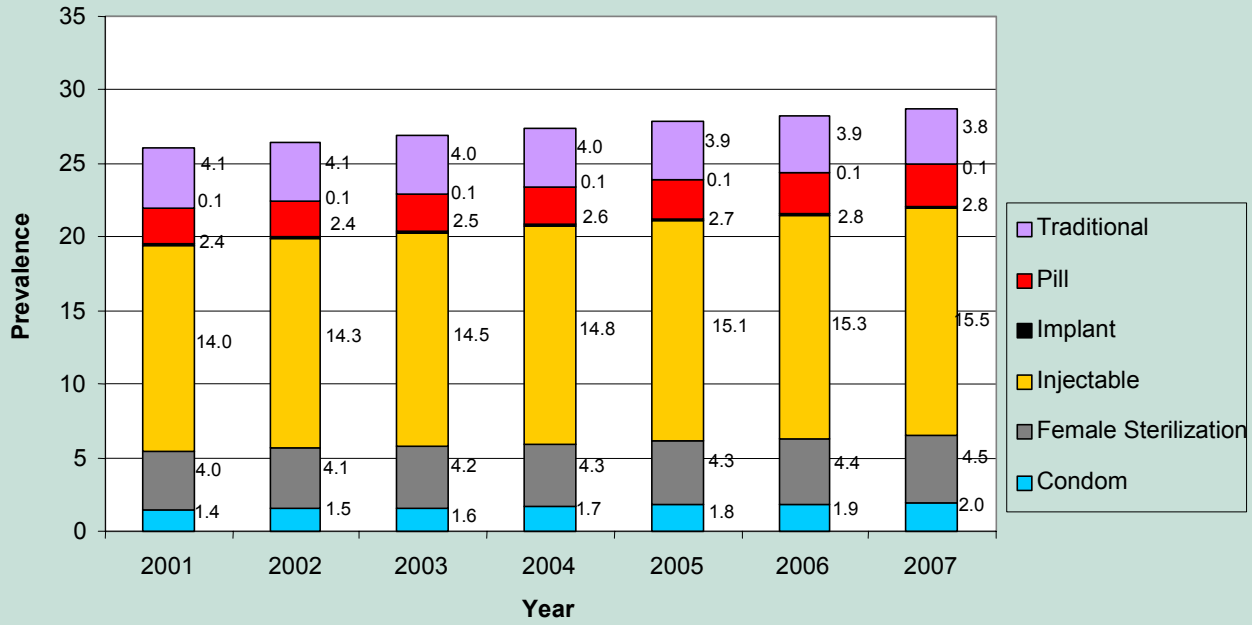
YEAR	TOTAL POPULATION	MALE POPULATION	FEMALE POPULATION	% FEMALES AGES 15–49
2001	11,390,012	5,632,701	5,757,312	44.87
2002	11,700,994	5,790,057	5,910,938	45.36
2003	12,050,715	5,966,968	6,083,745	45.72
2004	12,427,847	6,158,309	6,269,540	45.94
2005	12,822,560	6,359,579	6,462,980	46.07
2006	13,226,682	6,567,007	6,659,675	46.12
2007	13,636,112	6,777,862	6,858,249	46.12

Source: DemProj estimates, RTI.

The family planning projection embodies the above expected decrease in TFR concomitant with the increase in population. The expected TFR decrease is modeled as a function of:

- FP method protection attributes (e.g., Couple years of protection, average duration of use for long-term methods, average age of users for permanent methods, and method effectiveness). See **Appendix**.
- Proximate determinants of fertility. See **Appendix**.
- Method mix: current and anticipated future patterns of contraceptive method usage. The method mix shown in **Figure 1** was used:

Figure 1. Contraceptive Prevalence for Selected Methods: Malawi 2001-2007 (Source: FamPlan projection, RTI)



- Prevalence expectations for IUD and male sterilization are omitted from consideration in this exercise, which focuses on methods more broadly used and provided primarily by healthcare professionals other than physicians/clinical officers.
- Source distribution: The family planning projection contains estimates of current and anticipated future percentages of eligible women receiving their contraceptive services from different sources within Malawi:
  - Public Sector—Not including community-based distribution agents (CBDAs)
  - Private Sector—Not including CBDAs
  - Mission (CHAM)
  - Banja La Mtsogolo (BLM)
  - CBDAs (all)
  - Other Sources

Table 3 provides the source distribution assumed in 2001.

Table 3. Source Distribution for FP Methods in Malawi (2001): Percentage Provided by Sector

	PUBLIC SECTOR LESS CBDAS	PRIVATE SECTOR LESS CBDAS	MISSION (INCL. CHAM)	BLM	CBDAS (ALL)	OTHER SOURCES
Condom	38.9	2.1	2.8	7.3	4.7	44.2
Female sterilization	42.8	0.8	16.0	40.1	0.0	0.3
Injectable	78.7	5.9	9.5	5.0	0.9	0.0
IUD	42.8	2.1	15.9	39.3	0.0	0.0
Male sterilization	4.1	2.8	2.8	89.7	0.0	0.0
Implant	50.3	0.0	10.3	39.3	0.0	0.0
Pill	58.4	7.8	8.9	12.7	11.2	1.0
Traditional	1.0	0.0	25.0	1.0	1.0	72.0

ProTrain Model

The training needs projection (ProTrain) model starts with the above estimates of FP clients (new acceptors of long-term methods, and users of shorter-term methods) presenting for FP healthcare in the various sectors (Public, Mission, etc.) each year. In order to estimate whether and how the need for FP services can be met, the following information is added to the projection model:

- **Initial FP Providers**: The numbers and types of FP providers who are active in the base year of the projection period (2001). Based on discussions at RHU we combined FP professionals into several groups based largely on the services they commonly provide:
  - Registered nurses and registered nurse-midwives (RN/RNMs)
  - Nurse technicians and nurse-midwife technicians (NT/NMTs)
  - Clinical Officers (COs)
  - Medical Assistants (MAs)
  - CBDAs

- ***Future Providers***: Expected training outputs over the time period (i.e., the annual numbers and types of FP providers trained by):
  - RHU inservice training (RHU)
  - CHAM-affiliated Nursing Schools (CHAM)
  - Kamuzu College of Nursing (KCON)
  - Malawi College of Health Sciences (MCHS)

  College of Medicine training of Medical Officers was not included in the model because projections for Medical Officer provision of FP were not made.

- ***Procedure Time***: The training projection requires data on the number of minutes needed per client to provide a given method with adequate counseling and followup. Multiplying minutes per client by the number of clients per year gives the amount of time needed for the service. The model also takes into account other factors which limit the time that providers have available, including:
  - Hours worked per week, and weeks per year

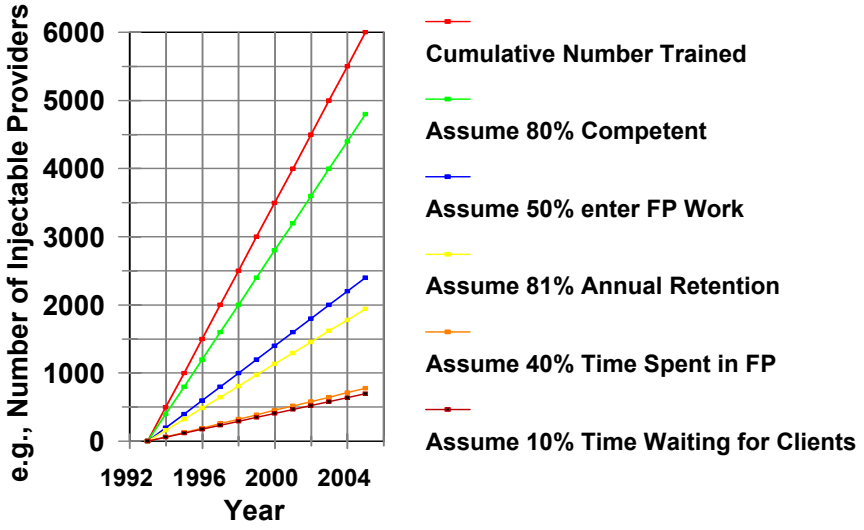
- Amount of provider time actually spent in FP service (versus other health services)
- Amount of provider downtime (e.g., waiting for clients)

♦ ***Provider Dynamics***: The utility of **ProTrain** is in the simultaneous modeling of a number of other factors that affect the pool of available providers over time. They include:

- Expected annual retention rates for providers
- Competency rates for newly-trained providers
- Percentage of new providers actually posted to (or returning to) FP service delivery points.

The simultaneous modeling of some of these factors is illustrated in **Figure 2**.

Figure 2. Theoretical Illustration: Factors Affecting Provider "Supply"



DATA AND ASSUMPTIONS

Family Planning Personnel 2001

Table 4 provides the estimated number of FP professionals working in Malawi in 2001. Note that for a given cadre in a particular sector (e.g., Clinical Officers in the Public sector) the same number (e.g., 323) is repeated across all of the methods that the cadre provides. Calculations within the model adjust for these multiple representations of multi-method providers. Data for this table come from several sources, including the *Malawi National Health Plan 1999–2004: Volume 3—Health Sector Human Resources Plan*, as well as the MOHP Human Resources Management and Development (HRMD) and Planning Unit offices, and the MOHP Reproductive Health Unit.

Table 4. Number of FP Personnel in Malawi (2001), by Sector, Cadre, and FP Method

	Condom	Female Sterilization	Injectable	IUD	Male Sterilization	Implant	Pill	Traditional
Public Sector—Less CBDAs								
CO	323	323	323	323	323	323	323	323
RN/RNM	374		374	374		374	374	374
NT/NMT	1268		1268	1268			1268	1268
MA	350		350	350			350	350
Private Sector—Less CBDAs								
CO	25	25	25	25	25	25	25	25
RN/RNM	30		30	30		30	30	30
NT/NMT	110		110				110	110
MA	60		60				60	60
Mission (incl. CHAM)								
CO	81	81	81	81	81	81	81	81
RN/RNM	84		84	84		84	84	84
NT/NMT	657		657	657			657	657
MA	123		123	123			123	123
Banja La Mtsogolo								
CO	27	27	27	27	27	27	27	27
RN/RNM	30		30	30		30	30	30
NT/NMT	41		41	41			41	41
MA	4		4	4			4	4
CBDAs (all)								
CBDA	2000						2000	

Source: Malawi Ministry of Health and Population.

Retention Rate

According to the *Project Financing Proposal for Human Resources Development in the Health Sector,* p. 11 "Wastage in the sector among professional cadres is estimated at 2.8%, with death being the most significant loss, and occurring more frequently among nurses and clinical officers under the age of 40 years." Loss of personnel was documented in more detail in Table 17 of the *Malawi National Health Plan 1999–2004*, covering losses due to death, retirement, resignation, and abscondment/dismissal. We chose to discount losses due to resignation, reasoning that these health professionals might be continuing their FP work in other sectors or jobs. The rates of retention were then calculated from the rates of loss (retention = 100% - percentage lost):

Table 5. Estimated Annual Loss/Retention of FP Personnel

CADRE	PERCENTAGE LOST	PERCENTAGE RETAINED
CO	3.5	96
RN/RNM	5.9	94
NT/NMT	3.5	96
MA	2.6	97
CBDA*	3.875	96

* CBDA rates estimated from the other cadres.
Source: Malawi Ministry of Health and Population.

Preservice and Inservice Training in FP Method Provision in Malawi

Clinical officers and both registered (RNs/RNMs) and enrolled nurses (NT/NMTs) are considered competent to provide the following methods upon graduation from preservice institutions: condom, injectable, pill, and traditional method.

At present, no cadre of healthcare provider is able to provide implants, IUDs or minilaparotomy directly after preservice. Selected cadres can become providers of these methods after attending competency-based inservice training.

In Malawi, the RHU trains approximately 20 RNs/RNMs and 20 COs per year in Norplant, and approximately 10 COs attend minilaparotomy training per year. There have not been significant efforts to provide IUD training to date (when it was offered, there were not enough clients for providers to become and remain competent with IUD insertion), and none are currently planned.

Data on training outputs for the current and past years (2001–2003) were obtained from the RHU, the Nurses and Midwives Council of Malawi, and the various training institutions covered in the model. **Table 6** provides current and anticipated preservice training, while **Table 7** contains the inservice training estimates. For years 2004–2007 some projections were available from *A 6-Year Emergency Preservice Training Plan*, produced by the MOHP Planning Unit. In certain cases, the projected training in the emergency plan would not produce graduates until the later years of the projection period (e.g., 2006 or 2007) owing to the length of time to graduation. In these cases, missing data for the interim years (e.g., 2004, 2005) were filled in by averaging the two numbers for the years bounding the interim (e.g., if 300 people were trained in 2003, and 500 were projected to be trained in 2006, 400 was entered in years 2004 and 2005).

Table 6. Projected Preservice Training: Malawi (2002–2007)

	2002	2003	2004	2005	2006	2007
Kamuzu College of Nursing[a]						
RN/RNM						
Condom	60	31	*45*	*45*	*45*	60
Injectable	60	31	*45*	*45*	*45*	60
Implant	60	31	*45*	*45*	*45*	60
Pill	60	31	*45*	*45*	*45*	60
Traditional method	60	31	*45*	*45*	*45*	60
Malawi College of Health Sciences[a]						
NT/NMT						
Condom	78	59	*50*	40	40	40
Injectable	78	59	*50*	40	40	40
Pill	78	59	*50*	40	40	40
Traditional method	78	59	*50*	40	40	40
MA						
Condom	7	133	*129*	125	125	125
Injectable	7	133	*129*	125	125	125
Pill	7	133	*129*	125	125	125
Traditional method	7	133	*129*	125	125	125
CO						
Condom	33	39	*57*	*57*	75	75
Injectable	33	39	*57*	*57*	75	75
Pill	33	39	*57*	*57*	75	75
Traditional method	33	39	*57*	*57*	75	75
CHAM: data combined from multiple schools[a]						
NT/NMT						
Condom	100	324	*367*	410	410	410
Injectable	100	324	*367*	410	410	410
Pill	100	324	*367*	410	410	410
Traditional method	100	324	*367*	410	410	410
CHAM: Malamulo Nursing School[b]						
CO						
Condom	20	11	*16*	*16*	*16*	*16*
Injectable	20	11	*16*	*16*	*16*	*16*
Pill	20	11	*16*	*16*	*16*	*16*
Traditional method	20	11	*16*	*16*	*16*	*16*

[a] Italicized numbers are estimates based on the average of the surrounding years.
[b] Italicized numbers here are average of previous years.

Shaded cells: Numbers come from A 6-Year Emergency Preservice Training Plan and assume implementation of the plan began in 2003 (resulting in graduates beginning in 2005 or 2006 depending on the course of study).

Sources: Malawi MOHP, Nurses and Midwives Council, and preservice training institutions.

Competency at Completion of Training

Competency can be a limiting factor in the supply of FP providers. For the current projections we did not model IUD provision because, according to the MOHP Reproductive Health Unit, a low availability of clients for this method prevents potential trainees from being able to gain enough experience/practice during training and attain competency. Estimates of provider competency for other methods came from discussions with personnel at RHU, the Nurses and Midwives Council, and at several of the preservice institutions. Generally, competency was estimated to be higher for the short-term methods, with a lower percentage of trainees being able to provide the longer-term methods after training:

- Condom: 95%
- Female sterilization: 85%
- Injectable: 90%
- Pill: 95%
- Implant: 85%
- Traditional: 90%

Competency rates were not thought to vary by cadre.

Table 7. Projected Inservice Training: Malawi (2002–2007)

	2002	2003	2004	2005	2006	2007
RHU						
CO						
Female sterilization	10	10	10	10	10	10
Implant	20	20	20	20	20	20
RN/RNM						
Implant	20	20	20	20	20	20
CBDA						
Condom	236	152	191	191	191	191
Pill	236	152	191	191	191	191

Sources: Malawi MOHP, NMCM, and preservice institutions.

Percentage of Graduates Entering Family Planning

One must take into account the postings of new providers just entering the workforce from preservice institutions (i.e., what percentage of the graduates find work that involves FP service delivery?). Likewise, inservice trainees undergoing FP method training may be re-assigned to non-FP work after training, or may lack the infrastructure or client base needed to put their training to good use.

Through discussions at RHU an estimate was made that 75% of inservice trainees remain in positions or locations that enable them to provide the services for which they were trained, except for CBDAs, of whom 100% are expected to remain in FP work after training. We did not

have data to estimate these rates for CHAM-affiliated school graduates or other preservice institution graduates, so we adopted a preliminary estimate of 85% for these, based on similar estimates that had been made for a training needs projection model in Kenya. The figure of 85% may be high, and so an alternative estimate will be considered in the results below.

Minutes Per Procedure/Service

Estimates for the time taken to provide quality FP services should include the time providers spend in counseling, method provision, and followup visits in a given year. The following estimates were arrived at through discussions with service providers at several service delivery points, and discussions at the RHU:

- Condom: 10 minutes
- Female sterilization: 45 minutes
- Injectable: 20 minutes
- Implant: 30 minutes
- Pill: 10 minutes
- Traditional: 10 minutes

Percentage of Time Spent in Family Planning Services

This information is probably best obtained through an averaging of data gained in surveys of members of each cadre at each type of service delivery point (SDP). The training projection model stores this information by sector (e.g., Public, Mission, etc.), and within sector, by cadre (e.g., RN/RNM, MA, etc.), and by method. Since the percentage of time spent in FP work is likely to vary greatly within a sector depending on whether a provider is posted at a hospital or clinic, it is useful to have set up the preliminary FamPlan model to focus on the different types of SDPs within a sector. However, the FamPlan model upon which the current training projections are based is organized by sector, but not by SDP type within sector, so the current estimates must reflect average percentage of time across the different facility types within a sector.

For the current training model these data were largely unavailable, with the exception of estimates provided by the RHU for clinical officers providing female sterilization: 10% of their time was estimated for this service in the Public and Banja La Mtsogolo (BLM) sectors, and 1% in the Private and Mission sectors.

For other cadres and methods we therefore adapted general percentage of time estimates from an earlier Kenya model. In that model, all cadres in the Public and Mission sectors had been estimated to spend 40% of their time in FP work, and those in the Private sector were estimated to spend 10% of their time on it. Providers in FPAK facilities (Family Planning Association of Kenya) were estimated to spend 100% time in FP work, and this percentage was used for the BLM sector in Malawi.

We then broke these percentages down by method. For instance, if RN/RNMs in the Public sector spend 40% time in FP, this percentage must be divided among the methods they provide. In order to get this breakdown we took the number of users (or acceptors, for long-term methods) by method for a given sector in the base year, and multiplied these by minutes per procedure, to get the total minutes expected per method in a given sector. We then divided the

total minutes per procedure by the total minutes of all procedures to get the percentage of time that each method used in the sector. This percentage was then multiplied by the 40% time available (in this example), to get the percentage of time per procedure, for instance:

- RN/RNMs spend 40% time in FP in Public sector;
- 203,750 users of injectables expected in 2001 in the Public sector;
- 20 minutes per user = 4,075,000 minutes;
- Minutes per all users/acceptors in 2001 in the Public sector (obtained through similar calculations and summary) = 4,682,100;
- 4,075,000/4,682,100 = 87% of client minutes are "injectable minutes;"
- 87% of client minutes X 40% RN/RNM time in FP = 34.8% time spent in injectable provision, by RN/RNMs, in the Public sector.

Table 8. Estimated Percentage of Time Spent Providing FP, by Method, Cadre, and Sector

	PUBLIC	PRIVATE	MISSION	BLM	CBDA
CO					
Female Sterilization	10.0	1.0	1.0	10.0	
Injectable	1.0	1.0	1.0	1.0	
Pill	1.0	1.0	1.0	1.0	
Traditional	1.0	1.0	1.0	1.0	
Implant	1.0	1.0	1.0	1.0	
RN/RNM					
Condom	0.9	0.2	0.4	3.3	
Injectable	34.8	8.7	24.6	45.5	
Pill	2.2	1.0	1.9	9.7	
Traditional	0.1	0.0	9.4	1.3	
Implant	0.1	0.0	0.1	1.2	
NT/NMT					
Condom	0.9	0.2	0.4	3.3	
Injectable	34.8	8.7	24.6	45.5	
Pill	2.2	1.0	1.9	9.7	
Traditional	0.1	0.0	9.4	1.3	
MA					
Condom	0.9	0.2	0.4	3.3	
Injectable	34.8	8.7	24.6	45.5	
Pill	2.2	1.0	1.9	9.7	
Traditional	0.1	0.0	9.4	1.3	
CBDA					
Condom					10.7
Injectable (added for projection purposes)					40.5
Pill					42.3

Source: JHPIEGO estimates based on RHU data and Kenya ProTrain assumptions.

FINDINGS

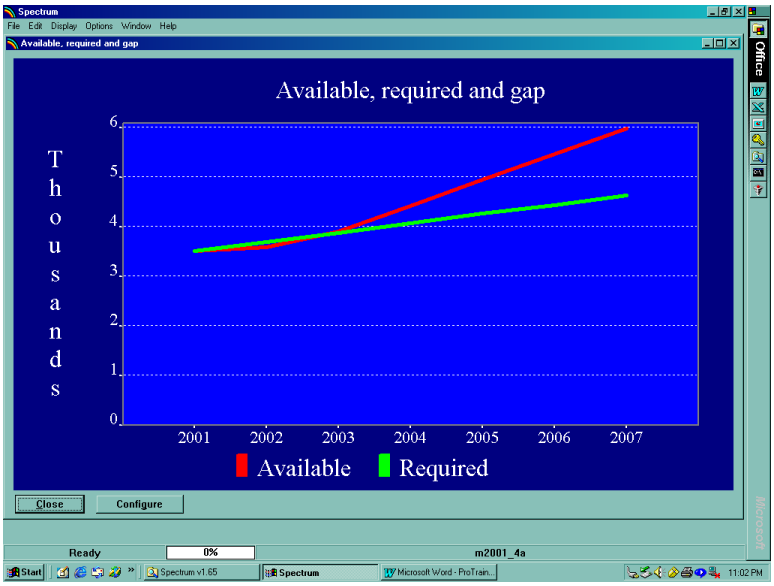
Projections

The RHU was interested in exploring several projections based on the priorities for Malawi:

1. Injectable provision by all cadres in Public, Mission, BLM, and CBDA sectors, with new providers (except CBDAs) trained by preservice institutions and RHU:

According to this projection the supply of injectable providers (red line) will grow from approximately 3,300 to 5,200 to exceed the number required (green line) by the end of this training projection period.

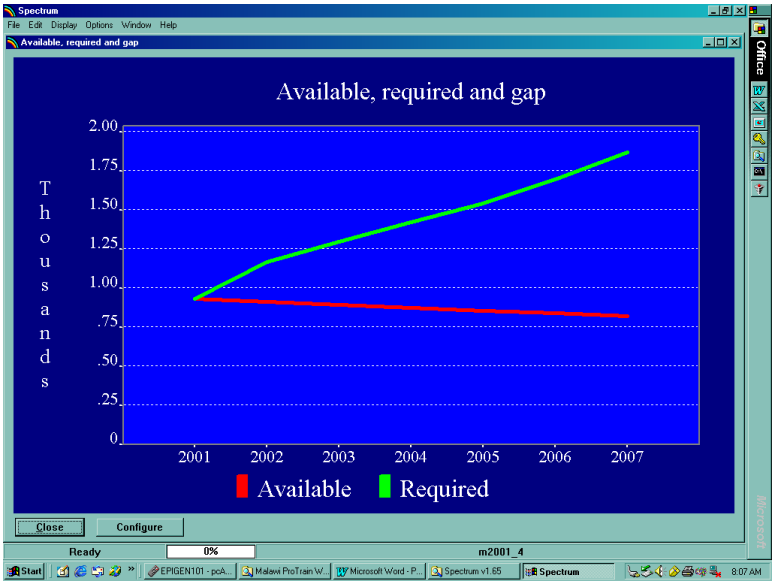
2. Injectable provision as above (1) but adding RHU training of CBDAs in injectables:



Projection 1 already shows a surplus of injectable providers with the current training outputs through 2007, and the addition of RHU training of CBDAs in this method accelerates the growth of this surplus. For the above Projection 2, it was assumed that a nominal number of CBDAs (100) were already providing injectables in 2001 (the assumption of a non-zero cadre is needed in the base year in order to model training inputs for the same cadre in future years). It was then assumed that the RHU would provide injectable training of 191 CBDAs in each year from 2004 through 2007 (the same number projected to be trained in pill and condom provision).

It should be noted that possible training of CBDAs in injectables is not necessarily a waste of resources, if the client load on other cadres such as NT/NMTs and RN/RNMs can be lightened. The above Projection 2 does not show this possibility, but one could return to the FamPlan model and alter the assumptions about where clients will be going to receive injectables. If one constructed an alternative model in which more injectable clients were served by CBDAs in the future years, the number of RN/RNMs, NT/NMTs, etc. needed to serve the injectable clients could be decreased, and one could model alternative client flow patterns (e.g., increasing the number of implant clients served by RN/RNMs). Use of the FamPlan and ProTrain modules within the Spectrum package of tools can permit this type of planning.

3. Norplant provided by RNs/RNMs and COs working in Public, Mission, and BLM facilities, with new providers trained by RHU:



4. Norplant provision as above (3), but adding new providers trained by preservice institutions (with 85% of trainees achieving competence, and 85% graduating into FP work):

   - Implant training for RN/RNMs is added at Kamuzu College of Nursing, with 45 trainees per year beginning in 2004.
   - Implant training for COs is added at Malawi College of Health Sciences, with 57 trainees per year beginning in 2004.

- Implant training for COs is added at CHAM/Malamulo, with 16 trainees per year beginning in 2004.

As seen in Projection 4 below, these additional training inputs do not result in enough providers to meet the expected demand, but at least the gap is lessening.

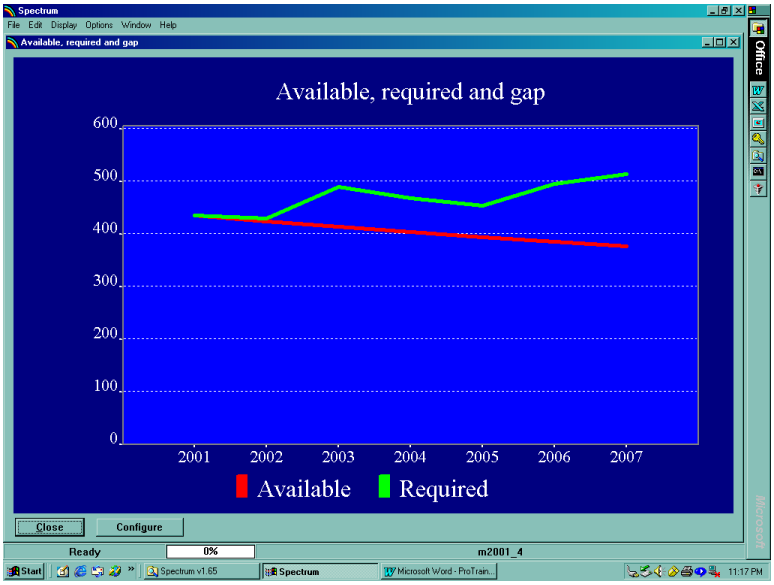
An additional program of inservice training by RHU could begin to close the gap; the following projection adds an intensive training effort by RHU as follows, from 2004–2007:

Table 9. Hypothetical Inservice Implant Training to Reduce Expected Deficit in Providers

YEAR	CO	RN/RNMS	TOTAL
2004	40	40	80
2005	80	80	160
2006	120	120	240
2007	160	160	320

With the addition of the above 800 implant providers over 4 years, we again assume the rate of 75% returning to locations/jobs where they can provide the method, and we assume 85% competency. This hypothetical program would increasingly close the gap between required and available implant providers in Public, Mission, and BLM sectors, as shown in the following projection:

5. Female sterilization provided by COs in public, mission, and BLM sectors, with new providers trained by RHU:

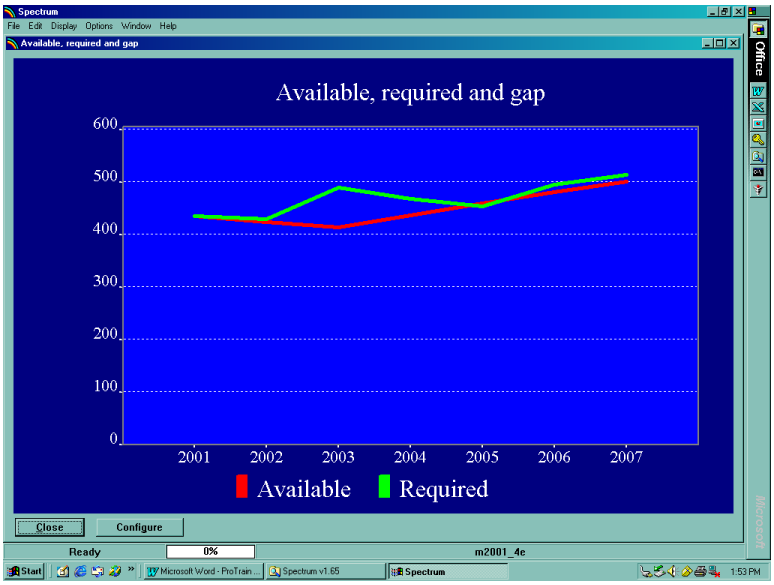


Projection 5 shows that while the demand for providers of female sterilization will generally increase through 2007, the supply of COs able to provide this service will be decreasing. This model includes projected RHU training of 10 COs per year in this method, and does not include potential service by medical officers. According to the FamPlan model, the vast majority of clients for this service are expected in either the Public sector or at BLM facilities (see **Table 3**). Because of the need for more providers of this method, the RHU suggested examination of scenario 6 (below).

6. Female sterilization as above (5), but adding new providers trained by preservice institutions:

The above projection shows the possibility of meeting and exceeding the demand for COs to provide female sterilization, through the introduction of preservice training beginning in 2004. For this projection we assumed that the graduates (COs) coming out of Malawi College of Health Sciences and CHAM/Malamulo would have competency (85%) in female sterilization as well as in the other projected methods (condom, injectable, pill, and traditional; see **Table 6**). CHAM/Malamulo would produce 16 CO graduates per year beginning in 2004, and Malawi College of Health Sciences would produce 57 graduates each year in 2004 and 2005, and 75 graduates each year in 2006 and 2007.

With a more modest program at the Malawi College of Health Sciences, including 30 CO graduates per year in 2004–2007, skilled in providing female Sterilization, the projection below shows that it is possible to very closely meet the expected demand for female sterilization without overshooting the goal.



In addition to the above modeling scenarios for longer-term methods, the following general projections were made for short-term methods:

7. Provision of condoms by all cadres in the Public, Private, Mission, BLM, and CBDA sectors, with preservice and inservice training inputs outlined in **Table 6** and **Table 7** (i.e., the "Other Sources" sector was excluded since we did not model provision by pharmacists, shopkeepers, or traditional birth attendants):

Although the projected supply of condom providers is growing at a steady rate, it does not meet the projected demand.

8. Provision of pills by all cadres in the Public, Private, Mission, BLM, and CBDA sectors, with preservice and inservice training inputs outlined in **Table 6** and **Table 7** (again excluding the "Other Sources" sector as explained above):

The demand for providers of pills will slightly outstrip the numbers of providers projected to be available, although the gap here is narrower than for the case with condom provision.

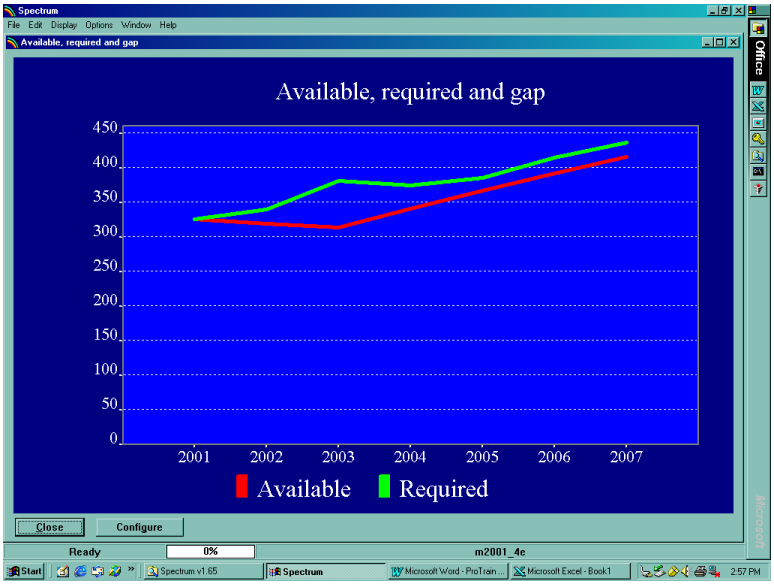
9. Provision of traditional methods by all cadres in the Public, Private, Mission, BLM sectors, with preservice and inservice training inputs outlined in **Table 6** and **Table 7** (again excluding the "Other Sources" sector as explained above):

The projection demonstrates an excess of trained providers of traditional methods.

DISCUSSION

Caution must be used in interpreting any projection. The accuracy of the projection is only as good as the information that has been used to create it. The training needs projections provide a relativistic view of available versus required personnel to meet FP service demand, rather than yielding absolute numbers. The case of CO provision of female sterilization can be used to illustrate this point.

In the earlier projections for female sterilization, demand is shown for 3 sectors together: Public, Mission, and BLM. If we focus only on the Public sector, the expected number of clients in 2001 is 5,050, rising to 6,780 by the year 2007, and the projection for the Public sector alone shows that the training plan outlined above will help close the gap in the Public sector, but not completely:



If we make all of the assumptions outlined previously about female sterilization services in the Public sector, we know the following:

- Each procedure takes 45 minutes.
- Therefore, 5,050 acceptors in 2001 require 227,259 minutes.
- COs work a 43 hour week, 48 weeks per year, and spend approximately 10% of their time providing female sterilization, so a typical CO has 12,384 minutes available in a year for this service.
- Therefore, the 5,050 acceptors can be served by 18.35 COs (227,259 minutes divided by 12,384 minutes per CO = 18.35 COs).

However, we have recorded 323 COs in the Public sector in 2001 providing female sterilization, as seen in **Table 4** and in the above graph. This is 17.6 times as many COs as one would calculate to be needed: 323 actual providers divided by 18.35 needed to serve 5,050 acceptors equals 17.6. The model, therefore, accepts our assertion that all 323 COs are providing female Sterilization, and adjusts each year's projection by this **adjustment factor** of 17.6. For example, by the year 2007, with an expected 6,780 clients (305,100 minutes), 24.6 COs (full-time

equivalents) would be needed, if this is a 45-minute procedure and the COs spend 10% of the time providing it. The model multiplies 24.6 by 17.6 to yield approximately 434 COs required in 2007 (see above graph). In this sense, the model is relativistic: all calculations are adjusted to the base year, which is accepted as a reality by the model. This is why in all projections, the number of required providers is always equal to the number of available providers in the base year (notice that the two lines always start off from the same point in the base year).

The adjustment factor has a huge impact on training projections. In the above example, if in reality only 18.35 COs were needed for female sterilization services in 2001, and only 24.6 were needed by 2007, the training needs are quite a bit smaller than if 323 COs were needed in 2001 and 434 will be needed in 2007.

Given this relativism, it is useful to examine assumptions or data when the adjustment factor strays away from 1.0, and especially when it strays to a high degree.

Suppose, in the current example, that even though there are 323 COs in the Public sector in 2001, we gather additional research to indicate that only about half of them were actually providing female sterilization services (e.g., 161 COs). The projection (below) now shows that our training effort will greatly exceed the demand for female sterilization after 2004. The adjustment factor for this model is now 8.8, which is considerably better than the above example.

Apart from the estimates of client demand, which come from the FamPlan model, the data most in need of accuracy for training modeling purposes are the number of personnel in the base year who are actually providing the various FP services in the different sectors, and the percentage of time they spend providing each method.

CONCLUSION

The above ProTrain results emphasize the need for further inputs in inservice training for long-term methods, Norplant and minilaparotomy. The projections, however, are dependant on

base year data inputs that may not be sufficiently reliable. While the total number of service providers in each cadre is known with confidence, based on recent human resources (HR) studies of the MOHP and routine HR data systems, the total number providing family planning services—and providing specific methods—is not as well established. While the use of the DemProj, FamPlan, and ProTrain modeling tools could assist in the modeling of family planning training needs, the input of more reliable base year data is needed before firm investments are made based on these results.

RECOMMENDATIONS

Base year personnel providing FP methods in each sector is perhaps the most important data for training needs projections. For validation of the current model this would be the place to start. One method might be a broad survey of healthcare personnel in different sectors and facilities, to determine:

- What percentages of each cadre are currently providing which FP services?
- Approximately what percentage of time (e.g., in a typical week or month) do they spend providing each method?

If these data could be reliably obtained for a representative sample of cadres, sectors, and facilities, it could help to validate the current assumptions used in the model. Although such a survey would be conducted, for example, in 2004 rather than going back retrospectively to the base year of 2001, it would likely provide adequate data to more accurately estimate the situation in 2001.

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Stover J and L Heaton (The Futures Group International). December 1999. *FamPlan Version 4: A Computer Program for Projecting Family Planning Requirements. Spectrum System of Policy Models*.

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APPENDIX

FP/RH PROJECTIONS UPDATE WORKSHOP INPUTS AND ASSUMPTIONS DATA (MARCH 11–12, 2003)

Table A-1. Method Protection Attributes

METHOD	COUPLE YEARS OF PROTECTION (CYP)/ AVERAGE AGE
Condom	120 per year = 1 CYP
Female Sterilization	Average age 35 = 10 CYPs
Injectable	4 per year = 1 CYP
IUD	1 = 3.5 CYPs
Male Sterilization	Average age 35 = 10 CYPs
Implant	1 = 3.5 CYPs
Pill	15 cycles per year = 1 CYP
Traditional	N/A

Table A-2. Method Effectiveness (Malawi RH Service Delivery Guidelines, October 2001)

METHOD	PERCENTAGE
Condom	88
Female Sterilization	99.5
Injectable	99.7
IUD	98
Male Sterilization	99.85
Implant	99
Pill	92.48
Traditional	55

Table A-3. Method Effectiveness Details for Pills and Traditional Methods

PROPORTION OF TOTAL PILLS		EFFECTIVENESS
16%	Progestin-only Pills (POPs)	95–99.5%
84%	Combined Oral Contraceptives (COCs)	92–99.9%
	Weighted average of low end of intervals	92.48

Traditional	Votes	Average
50	4	
55	2	55
60	3	

Table A-4. Malawi Method Mix (Percentages in Year Total to 100)

	Condom	Female Sterilization	Injectable	IUD	Male Sterilization	Implant	Pill	Traditional
1992	5.2	12.0	38.9	0.2	0.2	0.2	8.3	35.0
1993	5.2	12.4	40.7	0.2	0.2	0.2	8.4	32.6
1994	5.2	12.8	42.6	0.3	0.3	0.3	8.4	30.2
1995	5.2	13.3	44.4	0.3	0.3	0.3	8.5	27.9
1996	5.2	13.7	46.2	0.3	0.3	0.3	8.6	25.5
1997	5.2	14.1	48.1	0.3	0.3	0.3	8.6	23.1
1998	5.2	14.5	49.9	0.3	0.3	0.3	8.7	20.7
1999	5.2	14.9	51.8	0.3	0.3	0.3	8.8	18.4
2000	5.2	15.4	53.6	0.3	0.3	0.3	8.8	16.0
Change	Level	0.4	1.8	Level	Level	Level	0.05	-2.4

Table A-5. South Africa Method Mix

SOUTH AFRICA		
Pill	10.6%	18.8%
IUD	1.8%	3.2%
Injectables	23.2%	41.2%
Condoms	1.7%	3.0%
Female Sterilization	15.8%	28.1%
Male Sterilization	2.1%	3.7%
Traditional	1.1%	2.0%
Total	56.3%	100.0%

Source: DHS 1998.

Table A-6. Zimbabwe Method Mix

ZIMBABWE		
Pill	35.5%	66.2%
IUD	0.9%	1.7%
Injectables	8.1%	15.1%
Implant	0.5%	0.9%
Condoms	1.8%	3.4%
Female Sterilization	2.6%	4.9%
Male Sterilization	0.1%	0.2%
LAM	0.9%	1.7%
Traditional	3.2%	6.0%
Total	53.6%	100.0%

Source: DHS 1999.

Table A-7. March 2003 Workshop, 2015 Malawi Method Mixes

		ADEQUATE RESOURCES	CONSTRAINED RESOURCES
	MDHS 2000	**2015**	**2015**
Condom	5.2%	7.50%	8.50%
Female Sterilization	15.4%	18.50%	15.70%
Injectable	53.6%	57.25%	53.90%
IUD	0.3%	0.25%	0.25%
Male Sterilization	0.3%	0.35%	0.25%
Implant	0.3%	1.50%	0.45%
Pill	8.8%	9.75%	11.00%
Traditional	16%	4.90%	9.95%
Total	100%	100%	100%

Table A-8. Malawi Method Mix, by Source

SOURCE MIX (PERCENTAGES)	2000	2015		2000	2015
	CONDOMS			**MALE STERILIZATION**	
Public Sector (less CBDAs)	38.9	33		4	5
Private Sector (less CBDAs)	2	3		3	3
Mission (including CHAM)	2.8	3		3	4
BLM	7	10		90	88
CBDAs (all)	4.5	7		0	0
Other Sources	43.8	44		0	0
Total	99	100		100	100
	FEMALE STERILIZATION			**IMPLANT**	
Public Sector (less CBDAs)	42.5	47		50	55
Private Sector (less CBDAs)	0.8	0.8		0	2
Mission (including CHAM)	16.4	11.2		10	12
BLM	40.1	41		40	31
CBDAs (all)	0	0		0	0
Other Sources	0.3	0		0	0
Total	100.1	100		100	100
	INJECTABLE			**PILLS**	
Public Sector (less CBDAs)	79.1	73		59.3	46
Private Sector (less CBDAs)	5.8	7		7.7	8
Mission (including CHAM)	9.5	10		8.8	10
BLM	4.6	10		12.5	15
CBDAs (all)	1	0		10.6	20
Other Sources	0	0		1	1
Total	100	100		99.9	100
	IUD			**TRADITIONAL**	
Public Sector (less CBDAs)	43	43		1	1
Private Sector (less CBDAs)	2	2		0	0
Mission (including CHAM)	15.6	15.6		25	25
BLM	39.4	39.4		1	1
CBDAs (all)	0	0		1	1
Other Sources	0	0		72	72
Total	100	100		100	100

Table A-9. Proximate Fertility Determinants for Malawi

	2000	2015
Women in Union	71.50%	70.60%

Note: Same rate of decline used as indicated by 1992 and 2000 MDHS. The remaining determinants taken from 2000 MDHS and kept constant.

Table A-10. Alternate Total Fertility Rate (TFR) Projection for Malawi: 5.64 in 2015

YEAR	TFR	CHANGE
1992	6.73	
1993	6.68	0.05
1994	6.63	0.05
1995	6.59	0.04
1996	6.54	0.05
1997	6.49	0.05
1998	6.44	0.05
1999	6.40	0.04
2000	6.35	0.05
2001	6.30	0.05
2002	6.26	0.04
2003	6.21	0.05
2004	6.16	0.05
2005	6.11	0.05
2006	6.07	0.04
2007	6.02	0.05
2008	5.97	0.05
2009	5.93	0.04
2010	5.88	0.05
2011	5.83	0.05
2012	5.78	0.05
2013	5.74	0.04
2014	5.69	0.05
2015	5.64	0.05

Note: Applying same rate of decline as in 1992–2000 period, as indicated by 1992 and 2000 MDHS.